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Frey

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(54) **CONCUSSIVE HELMET**

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A42B 3/06	(2006.01)

(52) **U.S. Cl.**

CPC ***A63B 71/10*** (2013.01); ***A42B 3/064*** (2013.01)

(58) **Field of Classification Search**

CPC A42B 3/00; A63B 71/10

See application file for complete search history.

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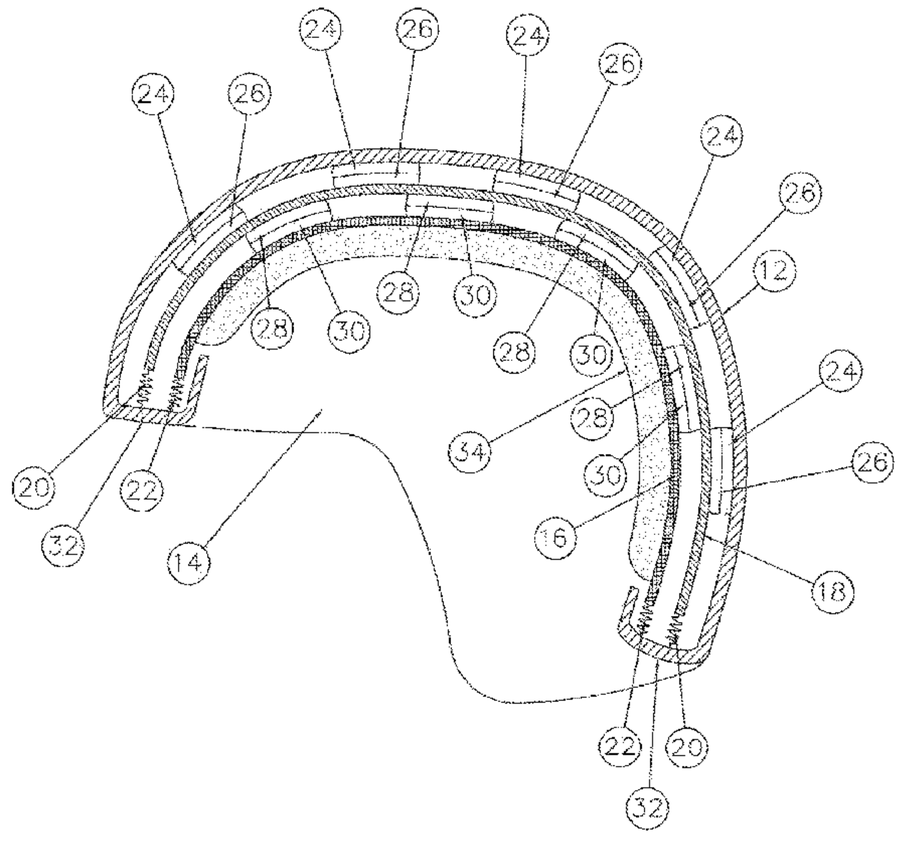
(57) **ABSTRACT**

An improved protective helmet having an outer impact receiving shell, and inner protective shell and an intermediate piston interposed between the outer and inner shells which allows the inner shell to decelerate gradually when the outer shell is subjected to a sudden impact, and which, therefore, permits the brain to decelerate safely.

2 Claims, 3 Drawing Sheets



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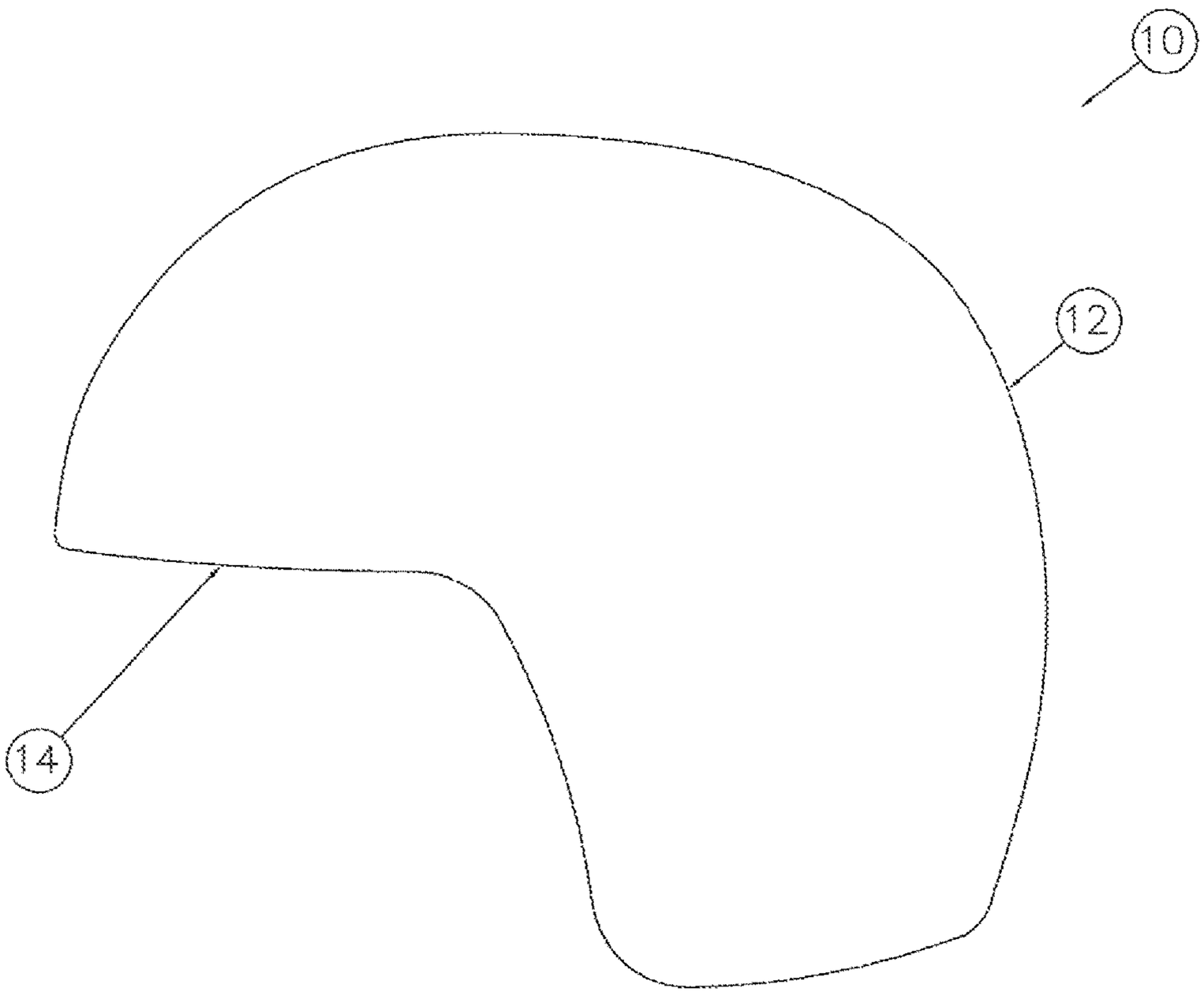

FIG. 1

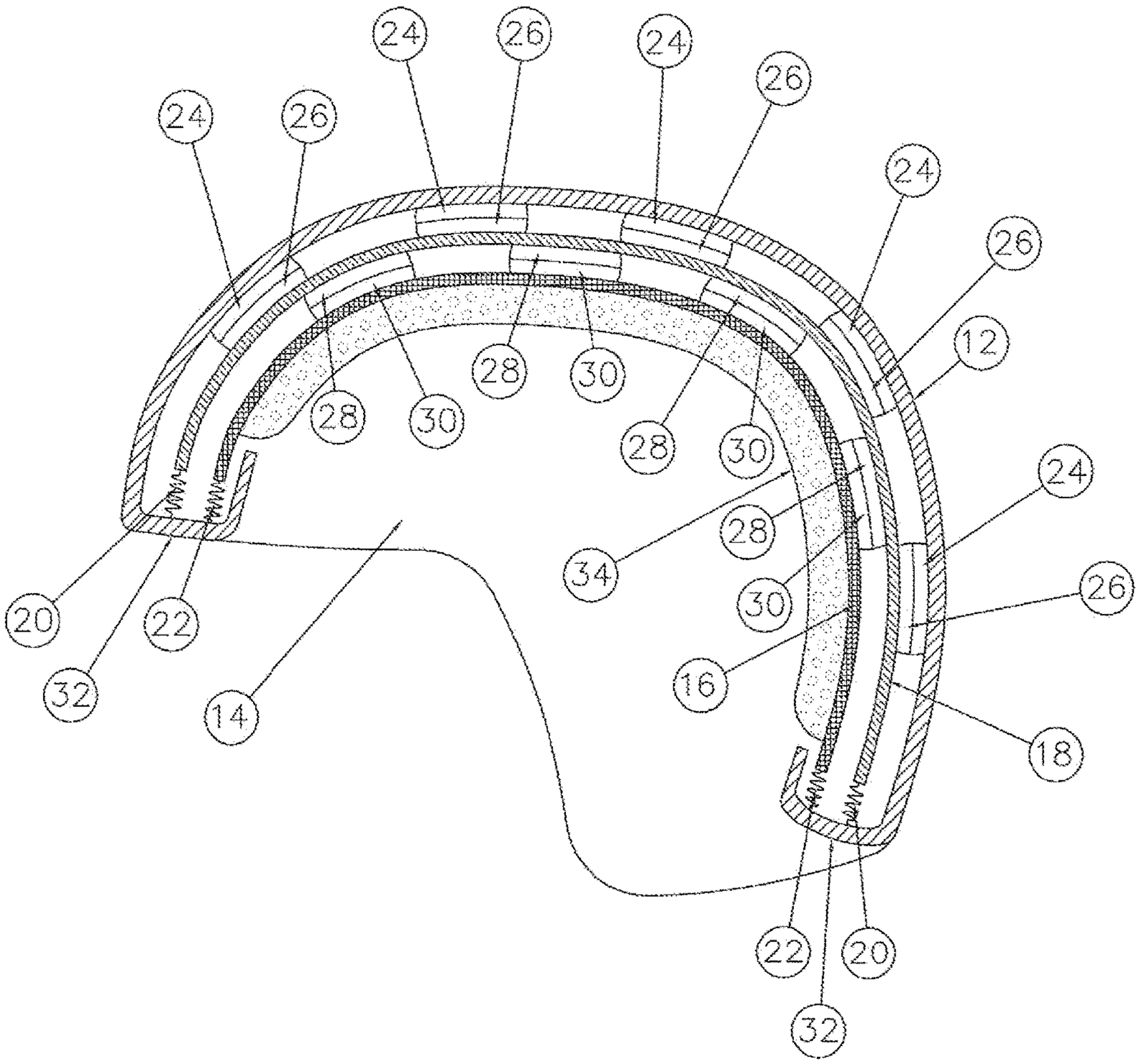
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FIG. 2

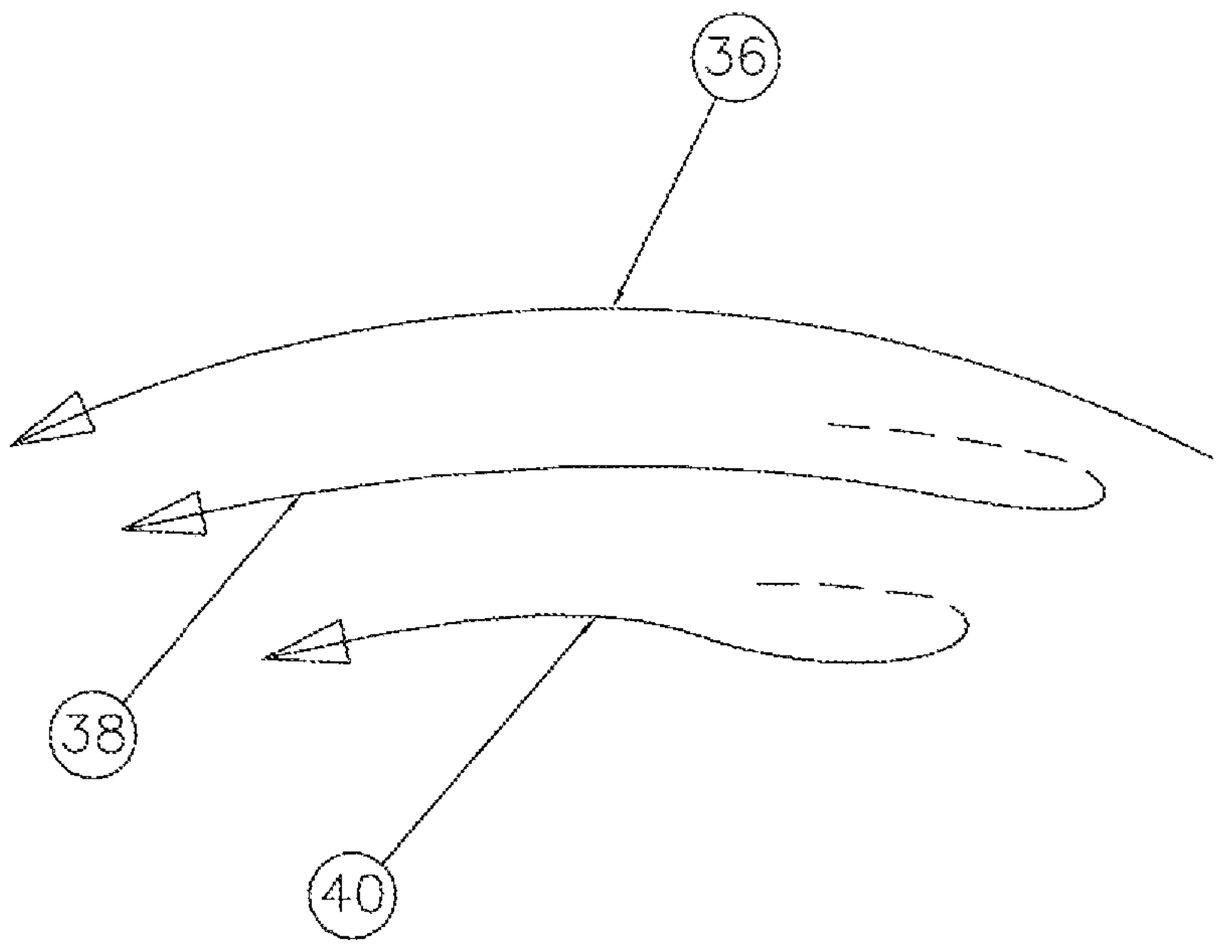

FIG. 3

CONCUSSIVE HELMET

FIELD OF INVENTION

This invention relates to helmets and is particularly directed to improved protective helmets for absorbing concussive forces encountered during sports events, motor ear racing, construction work and the like.

PRIOR ART

It is well known that serious and sometimes fatal head injuries are often sustained by persons engaged in activities, such as sports events, motor car racing, construction work and the like. Accordingly, it is common practice to require protective helmets for persons engaging in such activities. The prior art protective helmets seek to negate impact forces by absorbing or deflecting the majority of the impact. However, the prior art protective helmets miss the critical mechanism for brain injury. It is not the impact, but the sudden deceleration which causes brain injuries. This is the difference between laying your head on a pillow and laying it on a brick. The brick causes instant deceleration, whereas the pillow allows gradual deceleration. Unfortunately, none of the prior art protective helmets provide for gradual deceleration. Thus, none of the prior art protective helmets have been entirety satisfactory.

BRIEF SUMMARY AND OBJECTS OF INVENTION

These disadvantages of the prior art are overcome with the present invention and an improved protective helmet is provided which allows gradual deceleration of the head in response to a sudden impact, thereby allowing the brain to decelerate safely.

These advantages of the present invention are preferably attained by providing an improved protective helmet having an outer impact receiving shell, and inner protective shell and an intermediate piston interposed between the outer and inner shells which allows the inner shell to decelerate gradually when the outer shell is subjected to a sudden impact, and which, therefore, permits the brain to decelerate safely.

Accordingly it is an object of the present invention to provide an improved protective helmet.

Another object of the present invention is to provide an improved protective helmet allows gradual deceleration of the head in response to a sudden impact.

An additional object of the present invention is to provide an improved protective helmet is provided which allows gradual deceleration of the head in response to a sudden impact, thereby allowing the brain to decelerate safely.

A specific object of the present invention is to provide an improved protective helmet having in outer impact receiving shell, and inner protective shell and an intermediate piston interposed between the outer and inner shells which allows the inner shell to decelerate gradually when the outer shell is subjected to a sudden impact, and which, therefore, permits the brain to decelerate safely.

These and other objects and features of the present invention will be apparent from the following detailed description, taken with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a side view of a protective helmet embodying the present invention;

FIG. **2** is a vertical section through the protective helmet of FIG. **1**; and

FIG. **3** is a diagrammatic representation showing how the helmet of FIG. **1** reacts to a sudden impulse.

DETAILED DESCRIPTION OF THE INVENTION

In that form of the present invention chosen for purposes of illustration, FIGS. **1** and **2** show a protective helmet, indicated generally at **10**, having a generally spherical outer shell **12** formed of rigid material and having an opening **14** to permit entry and removal of a wearer's head and to provide visibility when the helmet is worn. A generally spherical inner shell **16** formed of rigid or semi-rigid material and a generally spherical piston **18** are located within the outer shell **12** and are freely and independently movable in any direction within the outer shell **12**. Resilient means, such as springs **20** and **22**, serve to maintain the inner shell **16** and piston **18** in generally centered positions within the outer shell **12**. Motion-retarding means, such as brake pads **24** and **26** are mounted between the outer shell **12** and the piston **18** to retard relative movement between the outer shell **12** and piston **18**, while additional motion-retarding means, such as brake pads **28** and **30**, are mounted between the piston **18** and the inner shell **16** and serve to retard relative movement between the piston **18** and the inner shell **16**. The pads of braking material **24**, **26**, **28** and **30** may be formed of material similar to the pads used in automotive brake systems. Also, preferably, the motion-retarding means **28** and **30** are off-set from the motion-retarding means **24** and **26** to cause shocks to the outer shell **12** to be delivered indirectly to the inner shell **16**. The outer shell **12** is provided with generally L-shaped end pieces **32**, which serve to retain the piston **18** and inner shell **16** within the outer shell **12**. Finally, padding **34** is provided on the inner shell **16** to provide additional cushioning and to comfortably lit the helmet **10** to the wearer's head.

In use, when a sudden impact is delivered to the protective helmet **10**, it tends to drive the outer shell **12** in the direction of the impact, as indicated by arrow **36** in FIG. **3**. Initially, inertia will cause the piston **18** to remain stationary, as indicated by the dashed portion of arrow **38** in FIG. **3** However, shortly after the impact, the force of the impact will be transmitted through the brake pads **24** and **26** to cause the piston **18** to also move in the direction of the impact, as seen by the solid portion of arrow **38**. However since the brake pads **24** and **26** allow some movement therebetween, the force of the impact which is delivered to the piston **18** will be significantly diminished. Also, the force from the outer shell **12** must travel some distance through the piston **18** in order to reach brake pads **28** and, hence, to be delivered through brake pads **28** and **30** to the inner shell **16**. This further diminishes the force which is delivered to the inner shell **16**. Similarly, when the piston begins to move, the inner shell **16** will, initially, remain stationary, as indicated by the dashed portion of arrow **40** in FIG. **3**, until the force of the impact is delivered through brake pads **28** and **30** to cause the inner shell **16** to also move in the direction of the impact, as seen by the solid portion of arrow **40**. Again, since the brake pads **28** and **30** allow some movement therebetween, the force of the impact which is delivered from the piston **18** to the inner shell **16** will be further diminished. Finally, the padding **34** will further reduce the force of the initial impact which is delivered to the wearer's head. Thus, the force of the initial impact is retarded and reduced between the outer shell **12** and tie

piston **18** and is further retarded and reduced between the piston **18** and the inner shell **16** and is still further reduced by the padding **34** before being delivered to the wearer's head. This greatly reduces the effect of the impact and serves to protect the wearer's head from concussion and other such injuries.

If desired, radio earphones or the like may be mounted within the inner shell **18**. Moreover, numerous variations other variations and modification can obviously be made without departing from the spirit of the present invention. Therefore, it should be dearly understood that the forms of the present invention described above and shown in the figures of the accompanying drawing are illustrative only and are not intended to limit the scope of the present invention.

What is claimed is:

1. A protective helmet comprising:

an outer shell;

an inner shell;

the outer shell having an anterior end terminating in an anterior L-shaped end piece; said anterior L-shaped end piece extending laterally to the interior of the protective helmet to a position posterior to the internal shell, wherein said anterior L-shaped end piece bends and extends vertically to a terminal portion parallel to an outermost portion of the outer shell so as to retain said inner shell within said outer shell, the outer shell having a posterior end terminating in a posterior L-shaped end piece extending laterally to the interior of the protective helmet to a position anterior to the internal shell, wherein said posterior L-shaped end piece bends and extends vertically to a terminal portion parallel to an outermost portion of the outer shell so as to retain said inner shell within said outer shell;

the inner shell having an anterior end attached by an anterior spring to the anterior L-shaped end piece on the anterior end of the outer shell, the inner shell having a posterior end attached by a posterior spring to the posterior L-shaped end piece on the posterior end of the outer shell, the anterior and posterior springs allow the inner shell to be freely movable within said outer shell;

a piston having an anterior end attached by a second anterior spring to the anterior L-shaped end piece on the anterior end of the outer shell, the piston having a posterior end attached by a second posterior spring to the posterior L-shaped end piece on the posterior end of the outer shell, the second anterior spring and second posterior spring allow the piston to be freely movable within said outer shell;

the piston being arranged between said outermost portion of the outer shell and said inner shell;

and a plurality of lower brake pads arranged between a lower surface of the piston and the inner shell, and a plurality of upper brake pads arranged between an upper surface of the piston and the outer shell, each brake pad of the plurality of lower brake pads being staggered from each brake pad of the plurality of upper brake pads such that an anterior end of each brake pad of the plurality of lower brake pads is near a posterior end of each brake pad of the plurality of upper brake pads, and a posterior end of each brake pad of the plurality of lower brake pads is near an anterior end of each brake pad of the plurality of upper brake pads.

2. The protective helmet of claim **1**, further comprising:

a padding layer lining said inner shell which is configured to provide cushioning and support for fitting the helmet to a wearer's head.

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